Endeavour to deliver final American to live on Mir

Launch moves to Jan. 20 to support activities aboard Russian space station

By Kyle Herring

Endeavour's return to space following a year and a half of maintenance, modifications and upgrades is set to begin on the night of Jan. 20 when it is launched to the Mir Space Station.

Though the flight readiness review is not scheduled until early in January, the launch date was moved about five days later to accommodate some additional operational activities on Mir, that included several space walks and the arrival and unpacking of a Progress resupply vehicle.

Endeavour's flight will mark the eighth time a shuttle has rendezvoused and docked with Mir as part of the Phase 1 Program. Astronaut Dave Wolf will return home after four months aboard the station and Andy Thomas will take his place as the final American to stay on Mir. He is scheduled to return home on *Discovery*'s next space mission—STS-91—scheduled for May.

The launch vehicle was scheduled to be positioned on the pad by this past Wednesday for initial validation testing leading into the holidays. Plans call for only minimal work to be done during the holidays.

The delay in rolling *Endeavour* from its processing hangar was due to an accidental finding to the upper surface of the left hand payload bay door. The indentation was caused when a weld broke on a part of one of the "strongbacks" that support the doors during opening and closing. The small ding was repaired before the transfer to the Vertical Assembly Bldg.

In parallel, an investigation team continues to seek the cause of an unusually large amount of thermal protection tile "hits" seen on *Columbia* following its return from STS-87. Though the roughly 300 damaged tiles posed no threat to the crew or mission, the program is interested in determining the cause and any correlation to future flights. The culprit is likely some thermal insulation coming off of the external tank at solid rocket booster jettison, so workers at Kennedy Space Center were to thin out the insulation on either side of the tank near the solid rocket boosters and take samples to ensure proper bonding.

The final launch dress rehearsal is scheduled for the first week of January. Commander Terry Wilcutt, Pilot Joe Edwards Jr., and Mission Specialists Mike Anderson, Bonnie Dunbar, Jim Reilly, Cosmonaut Salizhan Sharipov and Thomas will travel to Florida Jan. 4 for the Terminal Countdown Demonstration Test.

First space station pieces ready soon

By Kari Kelley

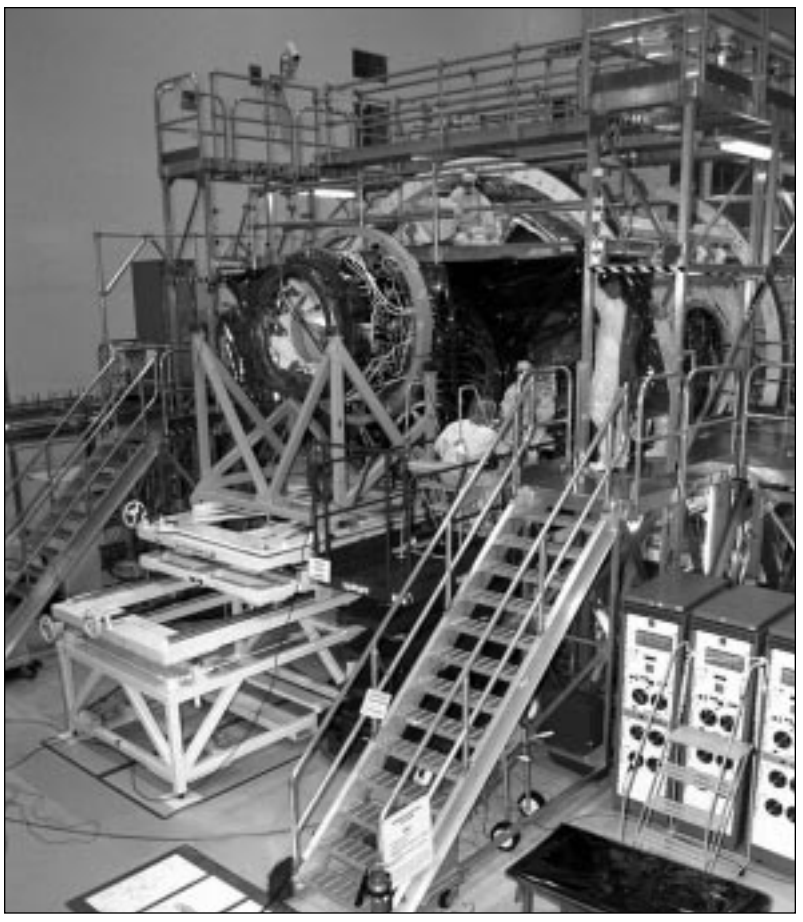
As the clock continues ticking toward the first launch of the International Space Station next June, more than a quarter million pounds of flight hardware have now been produced, and the first elements will soon be readied for launch.

The first element of the Space Station, the FGB, is on schedule for a launch targeted for late June 1998. It is undergoing final test integration in Moscow before being shipped to the Baikonur Cosmodrome in Kazahkstan, the Proton launch site, in early 1998. Built by the Khrunichev Space and Rocket Center, Moscow, under contract to Boeing, the 20-ton pressurized spacecraft will provide the initial propulsion and power for the International Space Station and become the first orbiting element. It will make the trip from Moscow to Baikonur on a special railroad car.

The second element, a connecting module called Node 1, and two pressurized mating adapters are at the Kennedy Space Center's Space Station Processing Facility undergoing final preparations for a July 1998 launch aboard *Endeavour* on STS-88. Late last month, the first mating adapter, designated PMA-1, was permanently attached to the node. The second adapter, PMA-2, will be attached in January, putting the station elements to be launched on STS-88 in the form they will be in when they are placed in *Endeavour*'s cargo bay early next summer. The node was delivered to KSC from the Boeing space station manufacturing facility at the Marshall Space Flight Center in Huntsville, Ala., this past June.

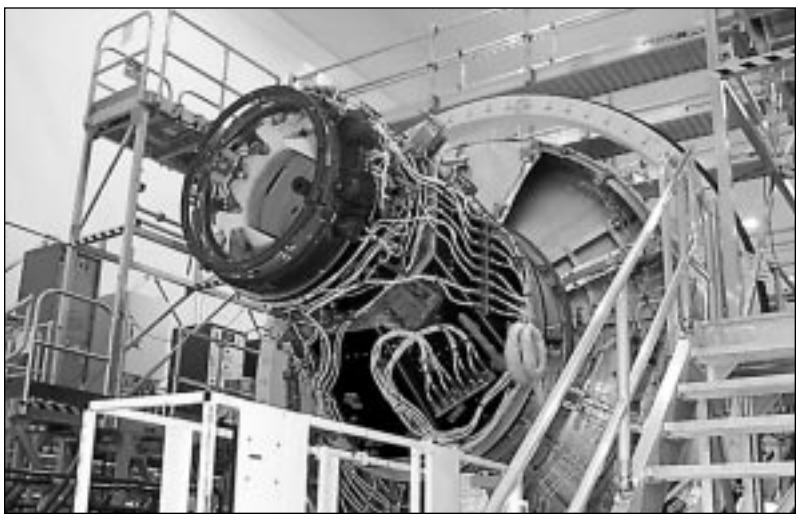
"Space Station hardware is being manufactured around the country, and, in fact, around the world," said Doug Stone, Boeing ISS program

Please see **STATION**, Page 8



KSC Photo KSC-97PC-1717

Top: Technicians at Kennedy Space Center's Space Station Processing Facility finish mating two pressurized mating adapters to an International Space Station connecting module called Node 1. Bottom: Support hardware is removed, clearly showing one of the PMAs mated to Node 1.



Managers review Mir space walk, docking flight plans

Phase 1 Program managers are set to begin a series of reviews that will lead to final approval for the launch of Endeavour in January and the start of the final increment of a U.S. astronaut on the Russian Space Station Mir.

NASA officials will take a close look at preparations for three space walks planned aboard the Mir in late December and early January as well as the STS-89 launch of Andy Thomas to Mir as the eighth and final U.S. crew member. Thomas will replace Dave Wolf, who has completed three months of a planned four-month research mission aboard the Mir. Thomas has been medically certified by Russian flight surgeons for his stay on Mir and has returned to the U.S. for final training.

"This type of mission is an endurance run instead of a sprint race like a shuttle mission," American Dave Wolf said this past Friday during a new conference from on board Mir. "I would say after about a month I was feeling extremely good, and after two months, I realize just how good you could feel in space. And I'm feeling better and better every day, enjoying working in space more and more, learning to handle the difficulties of working in space better and better. So it's getting better and better, although I miss home more and more."

On Wednesday, Mir 24 Commander Anatoly Solovyev and Flight Engineer Pavel Vinogradov planned to jettison a Progress resupply ship that's been attached to the Mir since October. After it is undocked, the Progress will automatically deploy a small German-built experimental satellite called "Inspekter" which will circle the Mir at a distance of approximately 100 meters to conduct a television survey of the station before separating for good.

On Dec. 30, Solovyev and Vinogradov plan to conduct another space walk, this time to repair a leaking outer airlock hatch on the Kvant-2 module. The hatch is used by space walkers exiting or reentering Mir. A new seal is being delivered to Mir along with supplies and food for the crew on the next Progress vehicle. That Progress, scheduled for launch on Dec. 20. should dock with Mir on Dec. 22.

Another space walk is planned for Jan. 5 by the two Russians to affix handrails to the depressurized Spektr module for additional refurbishment work that may be added to the schedule. A final space walk is planned for Jan. 12 to retrieve scientific gear left outside the Mir by Astronaut Jerry Linenger in April. If he receives final approval from Phase 1 officials, Wolf may join Solovyev for that space walk. Wolf has received approval from NASA managers to conduct on-orbit training for the space walk, but the final go-ahead is not expected until the new year.

"You know that since I was nine years old and Ed White did the first space walk from a Gemini capsule, I've wanted to do a space walk. And I've a healthy respect for the issue," Wolf said. "We trained intensely before the mission. I continue to train on board. And I'll be going outside if all goes well, as planned, with the most experienced space walker in the universe, certainly on Earth or in space around Earth, Anatoly (Solovyev)."

Test chamber team breaks seal, completes 91 day stay

A team of four JSC workers is scheduled to emerge from a sealed chamber in Bldg. 7 today, completing the longest such test of closed-loop environmental recycling systems so far.

Lunar Mars Life Support Test Project Phase III test subjects, Commander Nigel Packham, a Lockheed-Martin life support system engineer; Vickie Kloeris, a JSC shuttle food system manager; John Lewis, a Lockheed-Martin life support system engineer; and Laura Supra, an AlliedSignal life support system engineer, reported much success in a final report from "inside the tank."

"By the time you read this, the human portion of the Phase III Lunar Mars Life Support Test will have ended," the team wrote. "The door to the chamber opened at 9:04 this morning and we emerged to a whole different world than we left 91 days ago. Summer is gone and winter is here. The test has been a great success and the air and water recycling systems have performed above and beyond expectations with a great deal of scientific data having been collected.

"We have been completely sealed off from the outside world and have been continuously converting the carbon dioxide that we produce back into oxygen for us to breathe. The same air that was sealed in the chamber 91 days ago will be vented out at the end of the test. We began the test in September with seven days of water in the system, and during the mission the waste water system has processed nearly 10 tons (2,400 gallons) of water for our re-use.

"In addition," the team continued, "data has been collected for 13 different collaborative science studies during the 91 days, with analysis continuing well into 1998 and maybe beyond. Although we will be glad to spend Christmas with family and friends, we have made friendships during this test both in the chamber and on the outside which will last a lifetime. We thank everyone who has supported us during these 91 days. Whether the support was physical or emotional, it was all greatly appreciated. We hope to see the successes of this test translated into a human mission to Mars in the not too distant future. Happy holidays and all the best in 1998!"

JSC Photo 97-17585 by Robert Markowitz

HOME FOR HOLIDAYS—STS-87 Pilot Steve Lindsey is greeted by friends, family and well-wishers at Ellington Field's Hangar 990 following a flight back to Houston from Florida. Lindsey and the rest of the crew—Commander Kevin Kregel, Mission Specialists Winston Scott, Kalpana Chawla and Takao Doi, and Payload Specialist Leonid Kadenyuk—made it home Dec. 5 after the 16-day flight microgravity research flight.